Observations on Opisthobranchs of the Gulf of California

BY

HANS BERTSCH[1]

AND

ALBERIC A. SMITH[2]

Las Cruces Marine Station, Baja California, Mexico

INTRODUCTION

The southern part of the Gulf of California exhibits a tropical fauna that is still largely unknown. Owing to the ruggedness of the Baja California peninsula, the isolation of the region, and the smallness of the human population, this region has remained fairly inaccessible to collectors. The Las Cruces Marine Station, under the direction of Dr. Rita Schafer of Immaculate Heart College, Los Angeles, California, and sponsored by Mr. and Mrs. Bing Crosby, operates during the summer near La Paz, Baja California, to provide research facilities to broaden the knowledge of the animal and plant life of this section of the Gulf. During a recent study at the station, in July, 1969, we found substantially new data for a number of species of opisthobranchs. In this paper we report on a range extension and predator-prey relationships of *Navanax inermis*, and the presence of *Onchidiella binneyi* in the southern Gulf of California.

Navanax inermis (Cooper, 1862)

SYNONYMY and REFERENCES

Strategus inermis Cooper, 1862: 202 - 203
Navarchus inermis (Cooper). Cooper, 1863a: 8. Cooper, 1863b: 58. Bergh, 1893: 133 - 134; plt. 8, fig. 14. Bergh, 1894: 214 - 217; plt. 10, fig. 13; plt. 11, figs. 2 - 5.
Chelidonura inermis (Cooper). Bergh, 1900: 212. Bergh, 1905: 42 - 43
Aglaja sp. Pruvot-Fol, 1954: 50, fig. 8, g.
Navanax inermis (Cooper). Pilsbry, 1895: 131. Pilsbry, 1895-96: 57 - 58; plt. 15, figs. 89 - 93. Dall, 1921: 64. MacFarland, 1924: 390. Johnson & Snook, 1927: 255, 485 - 486; plt. 8, fig. 1; text fig. 494. Oldroyd, 1927: 49. MacGinitie, 1930: 68. Thiele, 1931: 395. MacGinitie, 1935: 737. Smith & Gordon, 1948: 179. MacGinitie & MacGinitie, 1949: 256, 313, 371 - 372, 374, 376 - 377, 380 - 381. Marcus, 1961: 7 - 8; plt. 1, figs. 14 - 16. Paine, 1963: 1 - 9. Steinberg, 1963: 116. Paine, 1965: 603 - 619. Lance, 1966: 71. MacFarland, 1966: 9 - 11; plt. 2, figs. 1 - 3; plt. 6, figs. 10, 11; plt. 7, figs. 21 - 23. Marcus & Marcus, 1967: 19, 149 - 151, 238; fig. 8 (of part II). Beondé, 1968: 376. Ricketts & Calvin, 1968: 300, 322-323, 513. Sphon & Lance, 1968: 80. Lance, 1969: 35. Roller & Long, 1969: 427. Bertsch & Smith, 1970: 19

DISTRIBUTION

The recorded range of *Navanax inermis* is from Elkhorn Slough, near Monterey, California (36°50′ N; 121°47′ W), to Laguna Manuela, Baja California (28°11′ N; 114°04′ W), and in the Gulf of California from Puerto Peñasco (31°17′ N; 113°35′ W) to Kino Bay, Sonora, Mexico (28°48′ N; 111°55′ W).

The new localities of the following specimens collected by the authors constitute a range extension of *Navanax inermis* over 250 miles southward to the southwestern end of Isla Cerralvo:

1) SW corner Isla Cerralvo (24°09′ N; 109°50′ W).
July 2, 1969; one specimen, 22 mm long; dredged from sandy bottom, about 30 feet deep. Inside of a dead pelecypod shell that was heavily encrusted with algae, tunicates and bryozoans.

2) Las Cruces Bay (24°13′ N; 110°05′ W).
July 4, 17, and 21, 1969; 3 specimens, 9 mm, 34 mm, and 29 mm long, respectively; 2 specimens found under rocks in 5 to 10 feet of water; a 3rd found during a dawn low tide on top of a rock, crawling amid algae, in 1 foot of water.

3) NW Isla Cerralvo (24°22′ N; 109°56′ W).
July 16, 1969; one specimen; under rocks, 10 feet of water.

[1] Permanent address: Franciscan School of Theology, 1712 Euclid Avenue, Berkeley, California 94709
[2] Permanent address: St. Elizabeth's High School, 1530 34th Avenue, Oakland, California 94601

4) Isla Espíritu Santo (24°31′ N; 110°22′ W).
One specimen, juvenile; 38 feet deep, at night with SCUBA, by Don Wobber (identified by Lawrence Andrews). This specimen is in the collection of the California Academy of Sciences and has not been reported previously.

PREDATOR-PREY RELATIONSHIPS

The diet preference of *Navanax inermis* for *Bulla gouldiana* Pilsbry, 1895, and *Haminoea virescens* (Sowerby, 1833) has been well documented (Johnson & Snook, 1927, p. 486; MacGinitie & MacGinitie, 1949, p. 372; Paine, 1963, pp. 1 - 9; 1965, pp. 603 - 619). The *N. inermis* we caught July 16 from NW Isla Cerralvo was kept alive in an aquarium. Later that day it excreted a shell of *Haminoea* cf. *H. angelensis* Baker & Hanna, 1927, which it had eaten in the field.

One specimen of *Navanax inermis* (obtained July 17) was fed a *Lamellaria inflata* (C. B. Adams, 1852). The *L. inflata* was placed in the same tank with *Navanax* at 9:00 p. m., was eaten sometime during the night, and its shell was excreted at 2:00 p. m. the following day. Although *Navanax* is known to feed on some prosobranchs (Paine, 1963, p. 5), this is the first recorded predation (laboratory fed) on *Lamellaria.*

The only anaspidean Paine (1963, p. 5) recorded as part of the diet of *Navanax inermis* is *Aplysia californica* Cooper, 1863. However, in the laboratory we observed feeding attempts on *Stylocheilus longicauda* (Quoy & Gaimard, 1824), the most common opisthobranch we found in the Las Cruces region in July. During the first observation, *Stylocheilus* touched the cephalic region of *Navanax. Stylocheilus* contracted violently, jerked the anterior half of its body up and down several times, pulled back slightly and then crawled forward quite rapidly (in relation to its normal speed of crawling). It did this by extending its anterior portion, then pulling up the rest of the body. This extending-contracting motion was so great, that during the contracted phase the mid-ventral region was arched above the substrate, not in contact with the surface on which the animal was crawling. The second observation involved a 34 mm *Navanax* and a 19 mm *Stylocheilus.* Again *Stylocheilus* exhibited a vehement escape reaction. When the tips of *Navanax*'s head shield touched the anterior end of *Stylocheilus,* the prey lifted up its head and actually turned a somersault, flipping over backwards to escape. Shortly afterwards, the predator approached the mid-lateral region of *Stylocheilus* and attempted to ingest it. Eversion of the buccal mass was observed as *Navanax* unsuccessfully tried to suck in its food. *Navanax* later came upon the *Stylocheilus* from behind and touched the tail of the *Stylocheilus.* Its prey pulled in its tail quickly and contracted it towards the main part of its body.

The large size of *Stylocheilus* in comparison with that of *Navanax* (Paine, 1965, p. 605, discusses the relative size of prey that a *Navanax* can swallow whole) and its escape reactions resulted in its not being eaten by *Navanax* during the observed feeding attempts.

Onchidiella binneyi (Stearns, 1893)

REFERENCES

Stearns, 1878: 399 - 401; plt. 7, fig. 7. Stearns, 1893: 342 - 343; plt. 50, figs. 1, 2. Keen, 1958: 512. Parker, 1964: 157. Marcus & Marcus, 1967: 227 - 232; fig. 83 (of part II). Farmer, 1968: 50 - 51.

DISTRIBUTION

Onchidiella binneyi is commonly found throughout the northern half of the Gulf of California. Although Keen (1958, p. 512) states it can be found "throughout the Gulf of California," the only published locality records, as far as we have been able to ascertain, are between Puerto Peñasco (31°17′ N; 113°35′ W) and Bahía San Francisquito (28°26′ N; 112°54′ W).

On the dawn low tide of July 6, 1969, the senior author collected 16 specimens of *Onchidiella binneyi* from the upper middle tide zone in Las Cruces Bay (24°13′ N; 110°05′ W). They were congregated under submerged rocks in groups of 3 - 5 individuals. This is a range extension of approximately 275 miles into the southern extreme of the Gulf of California.

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